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(54) **Terminal connecting device for flexible substrate**

Anschlussklemmenanordnung für ein flexibles Substrat

Dispositif de borne de connexion pour substrat fexible

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to terminal connecting devices for readily and securely connecting signal input/output terminals of a flexible substrate to those of an external substrate.

BACKGROUND OF THE INVENTION

[0002] Large numbers of electronic components are incorporated in portable telephones, video cameras, and other electronic devices which are recently becoming increasingly smaller and lighter. Most components are mounted on substrates. To provide inter-substrate passage for electrical signals, flexible substrates are mostly used because of their light weight and versatility to form complex wiring. The following is some conventional methods to connect a flexible substrate to an external substrate:

(1) The flexible substrate has, either on its end or internally, signal input/output terminals which are secured to those of an external substrate by soldering.
(2) Signal input/output terminals 52 are provided at an end of a flexible substrate 51 as shown in Figure 5. The terminals 52 are inserted and thus secured to a connector 55 on an external substrate 54.
(3) Japanese Laid-Open Patent Application No. 9-22760/1997 (Tokukaihei 9-22760; published on January 21, 1997) discloses a structure in which signal input/output terminals 62 of a flexible substrate 61 contact a connector 63 with contact pins 64 on an external substrate 65 as shown in Figure 6 to establish electrically conducting paths. The flexible substrate 61 is provided with engagement holes 61a with which engagement claws 63a of the connector 63 engage to secure the flexible substrate 61 onto the connector 63.

[0003] However, these methods entail following problems.

[0004] According to method (1), soldering is essential. In addition, prior to the soldering, the flexible substrate must be positioned precisely relative to the external substrate. In flexible substrates popularly used in recent years, the signal input/output terminals have so narrow intervals between them that the terminals makes a short circuit with an adjacent one even with a slight displacement in positioning. Therefore, extreme care is required in the positioning, which reduces operating efficiency. Besides, a solder and soldering iron need be prepared, as well as work space for the soldering operation. The flexible substrate must be removed to perform a maintenance operation and replace malfunctioning parts. In a worst case scenario, the external substrate, not to mention the flexible substrate, cannot be used again.

[0005] According to method (2), no soldering is necessary. Neither are preparations nor work space for it. The external substrate and the substrate can be used again. However, as shown in Figure 5, the connector 55 must be mounted to the external substrate 54 in advance and a part of the external substrate 54 must be set aside in advance to attach the connector 55. In addition, typically, the connector 55 for use with flexible substrates requires the flexible substrate 51 to have a predetermined thickness on the back of the signal input/output terminals 52; a plate member 53 of a resin, for example, needs be attached to provide extra strength to it. Cost adds up due to additional labor and materials needed in positioning and combining operations to attach the plate member 53.

[0006] According to method (3), similarly to method (2), no soldering is necessary. Neither are preparations nor work space for it. The external substrate and the substrate can be used again. No plate member need be attached to provide extra strength to the flexible substrate 61. However, similarly to (2), the connector 63 with the contact pins 64 needs be mounted in advance to the external substrate 65 as shown in Figure 6, and a part of the external substrate 65 must be set aside in advance to attach the connector 63. This entails expansion of the external substrate 65.

[0007] US 5 730 619 describes device according to the preamble of claim 1 with a mounting bar which is provided in a connector system, which includes posts extending upward from the mounting bar, and a slide locking bar having slots formed therein is slid around the post to lock a first flexible circuit and another device in a mating arrangement.

[0008] WO 98/00884 describes a connector with a post projecting from a surface of a board, where each post has an enlarged head. The head, when mated with a slot on the connector, achieves a camming action resulting in a predetermined normal force versus insertion position relationship.

[0009] EP 0 509 380 describes a flexible cable held in position by a lock piece provided on a housing. When the housing is fixed to a circuit board, the lock piece is yielding bent pushing the rear-side of the flexible cable.

SUMMARY OF THE INVENTION

[0010] The present invention has a principal objective to offer terminal connecting devices for readily and securely connecting terminals of a flexible substrate to those of an external substrate, which allows for reduction in size of the external substrate by means of elimination of needs to use a connector and which can be manufactured at reduced cost.

[0011] A terminal connecting device in combination with an external substrate for a flexible substrate in accordance with the present invention, in order to solve the problems, includes: press means for connecting signal input/output terminals of a film-like flexible substrate pro-

vided with a wiring pattern to those of the external substrate by pressing the signal input/output terminals of the flexible substrate to those of the external substrate from a surface opposite to one where the signal input/output terminals of the flexible substrate are provided, and a hold body, wherein the device is adapted to be attached to the external substrate by the hold body; and hold members, wherein the hold members, and holes provided in the flexible substrate, are adapted to hold the flexible substrate to the device, the hold members and holes adapted to hold the flexible substrate to the device before the device is attached to the external substrate by the hold body, wherein the hold body has a claw structure that is adapted to engage the hold body to a recess in the external substrate.

[0012] In the arrangement, the press means presses the signal input/output terminals of the flexible substrate from a surface opposite to one where those of the flexible substrate are provided, to establish connections between those of the flexible substrate and those of the external substrate.

[0013] This ensures establishment of electrically conducting paths between the flexible substrate and the external substrate.

[0014] For a fuller understanding of the nature and advantages of the invention, reference should be made to the ensuing detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Figure 1 is an exploded perspective view showing an arrangement of a terminal connecting device of an embodiment in accordance with the present invention and of an external substrate and a flexible substrate used in combination with the device.

Figure 2 is an enlarged perspective view showing an arrangement of resin springs of the terminal connecting device shown in Figure 1.

Figure 3 is a cross-sectional view showing a flexible substrate being attached to the terminal connecting device shown in Figure 1.

Figure 4 is a cross-sectional view showing an external substrate being additionally attached to the combined components shown in Figure 3.

Figure 5 is a perspective view showing a structure that connects a conventional flexible substrate to an external substrate.

Figure 6 is a perspective view showing another structure that connects a conventional flexible substrate to an external substrate.

DESCRIPTION OF THE EMBODIMENTS

[0016] Referring to Figure 1 to Figure 4, the following will describe an embodiment in accordance with the present invention, taking a liquid crystal display device as an example.

[0017] Figure 1 is a perspective view showing a terminal connecting device 4 which constitutes an embodiment in accordance with the present invention and associated components. A liquid crystal panel 1 is connected to a flexible substrate 2. On the flexible substrate 2 are there provided electronic components to drive a liquid crystal module.

[0018] The flexible substrate 2 is constructed in film form and provided with a wiring pattern (not shown). Signal input/output terminals 3 are provided side by side on the same surface of the flexible substrate 2 as are the foregoing electronic components. Holes 2a and 2b are provided surrounding the terminals 3.

[0019] The (first) holes 2a are located closer to the center of the flexible substrate 2 than the signal input/output terminals 3. The (second) holes 2b are located closer to an end of the flexible substrate 2 than the signal input/output terminals 3. Each hole 2a is formed with a smaller diameter than that of the head of a hold pin 4d (will be detailed later), but has a notch 2c where the head can be inserted.

[0020] Each hole 2b is formed in an elliptic shape with its major axis parallel to a longitudinal direction of a resin spring (press means, elastic body) 4b (will be detailed later) that is, a direction from the secured to free ends of the resin spring 4b when the flexible substrate 2 is attached to the terminal connecting device 4.

[0021] An external substrate 5 has a rectangular recess 5a on each side and is provided with signal input/output terminals 6 whose number matches that of the signal input/output terminals 3 of the flexible substrate 2.

[0022] The terminal connecting device 4 is made of resin and is provided with resin springs 4b near an end of a base section 4a as a support base along which no hold body sections (hold bodies) 4c is provided. Each resin spring 4b is positioned to contact the back of an associated signal input/output terminal 3 of the flexible substrate 2. The number of the resin springs 4b matches that of the signal input/output terminals 3 of the flexible substrate 2. The resin spring 4b is elastic, acting like a spring in response to application of a stress. The resin spring 4b has such a shape that, when a stress is applied to it from above, it is elastically distorted downward.

[0023] The base section 4a has along its sides the hold body sections 4c which stand substantially vertically to the base section 4a. Each hold body section 4c has substantially the same width as the recess 5a and is topped with a claw stricture which thrusts through the recess 5a and stops near the recess 5a on the upper surface of the external substrate 5. The claw structure has a slope so that its head slides smoothly in the recess 5a when engaging the hold body section 4c to the recess 5a.

[0024] In the vicinity of the resin springs 4b are there provided hold pins 4d as first hold members (first elongated members) and hold pins 4e as second hold members (second elongated members). Each hold pin 4d, 4e

as an elongated member is constituted by an elongated portion and a head; the head has a larger diameter than the elongated portion and is, for example, spherical. The hold pins 4d are located at predetermined positions by the side of the resin springs 4b near their secured ends, whilst the hold pins 4e are located at predetermined positions by the side of the resin springs 4b near their free ends. The holes 2a, 2b and the hold pins 4d, 4e are provided for positioning purposes in attaching the flexible substrate 2 to the terminal connecting device 4.

[0025] Now, a description is given in detail about the resin springs 4b. As shown in Figure 2, each resin spring 4b so arches that its shape is convex up. The resin spring 4b is secured at one of its ends (secured end) to the base section 4a near the center of the base section 4a and hovers at the other end (free end) above the base section 4a. The structure enables the resin spring 4b to practically stay in the arched shape. The flexible substrate 2 distorts in accordance with the shape of the resin springs 4b and pushes up the external substrate 5 vertically, efficiently transmitting stress from the resin springs 4b to the signal input/output terminals 6 of the external substrate 5.

[0026] The resin spring 4b has a thickness that is the largest at the secured end and tapers toward the free end and is provided on its upper surface with an arching press hump (hump) 7. As the area becomes smaller where the press humps 7 contact the flexible substrate 2, the flexible substrate 2 is pressed to the external substrate 5 with increasingly stronger force, and it is better ensured that electrically conducting paths are established between the signal input/output terminals 3 of the flexible substrate 2 and the signal input/output terminals 6 of the external substrate 5.

[0027] The flexible substrate 2 is attached to the terminal connecting device 4 as it is held in place in accordance with the shape of the resin springs 4b by the hold pins 4d, 4e as mentioned above. When attaching the flexible substrate 2, the head of the hold pin 4d expands the notch 2c of the hole 2a and thus enables the hold pin 4d to pass through the hole 2a. The head, once thrust, holds the hold pin 4d in place and does not allow it to slip off the hole 2a. The hold pin 4e can pass through the hole 2b with no notch, since the hole 2b is elliptic. The head of the hold pin 4e holds the flexible substrate 2 in place in the same manner as does the hold pin 4d.

[0028] The liquid crystal panel 1 is turned over and placed beneath the lower surface of the terminal connecting device 4 as shown in Figure 3. The flexible substrate 2 is pushed up at the signal input/output terminals 3 by the resin springs 4b. Under these conditions, the resin springs 4b thrust above the line 31 representing the surface of the external substrate 5 when the terminal connecting device 4 is attached to the external substrate 5.

[0029] The terminal connecting device 4 is attached to the external substrate 5 by the hold body sections 4c as shown in Figure 4. Under these conditions, the resin springs 4b are pushed down by the external substrate 5 and elastically distorted. Due to a repulsive force arising from the elastic distortion of the resin springs 4b, the signal input/output terminals 3 of the flexible substrate 2 contact, and thus establish electrically conducting paths to, the signal input/output terminals 6 provided on the external substrate 5. This provides passage for electrical signals to and from the external substrate 5.

[0030] When attaching the terminal connecting device 4 to the external substrate 5, the resin springs 4b are pressed by the external substrate 5 and elastically distorted with their free ends moved toward the hold pins 4e. Since the holes 2b are elliptic, the holes 2b allow the edge of the flexible substrate 2 to move accordingly. In addition, the hold pins 4e do not slip off the holes 2b, which ensures that the flexible substrate 2 is pressed to the external substrate 5.

[0031] Further, the recesses 5a are formed in the external substrate 5 to help positioning. This makes the positioning of the terminal connecting device 4 easier and rarely allows the terminal connecting device 4 to be displaced due to vibration or shock.

[0032] Now, the following will describe an assembly process in reference to Figure 1.

[0033] First, the hold pins 4d of the terminal connecting device 4 are inserted into the holes 2a of the substrate 2, and the hold pin 4e of the terminal connecting device 4 are inserted into the holes 2b of the flexible substrate 2.

[0034] Next, the flexible substrate 2 is folded to place the liquid crystal panel 1 beneath the lower surface of the terminal connecting device 4. The hold body sections 4c are then coupled to the recesses 5a to attach the terminal connecting device 4 to the external substrate 5. Thus, the signal input/output terminals 3 of the flexible substrate 2 are pressed to the signal input/output terminals 6 of the external substrate 5 by the resin springs 4b and the press humps 7. In this manner, in the assembly process, all the forces that the flexible substrate 2 receives are vertical.

[0035] When there is a need to replace a component, the members can be readily disassembled by removing the members in a reverse order to the assembly operation. The disassembly involves no complex operations and very unlikely damage any parts. As the terminal connecting device 4 is removed from the external substrate 5, the resin springs 4b returns to its original shape and therefore can be recycled. The flexible substrate 2, which is not soldered or inserted into a connector, is very unlikely damaged in the removal and can be recycled provided that it functions well.

[0036] As detailed in the above, the terminal connecting device 4 of the present embodiment is provided with resin springs 4b that presses the flexible substrate 2 on the back of the signal input/output terminals 3; therefore, no connector or the like for connecting the signal input/output terminals 3 need be provided on the external substrate 5. This allows for reduction in size of the external substrate 5. The hold pins 4d, 4e and the holes 2a, 2b holding the flexible substrate 2 to the terminal connecting device 4 prevents the flexible substrate 2 from hovering

above the resin springs 4b. This provides protection to the flexible substrate 2 in, for example, loading or mounting it in a device, since there is no likelihood of it being caught.

[0037] The present embodiment was illustrated by means of the terminal connecting device 4 connecting the liquid crystal panel 1 to the flexible substrate 2 as an example. However, the terminal connecting device 4 may be used with other devices. The flexible substrate was a substrate with electronic components provided thereon; alternatively, the flexible substrate may be other kinds of substrates, including substrates with no electronic components provided thereon and tape carrier packages (TCP). The hold pins 4d, 4e and the holes 2a, 2b may be increased or decreased in number according to the dimensions of the flexible substrate 2 and the terminal connecting device 4. Further, all the resin springs 4b were arranged side by side in a single array on the base section 4a; alternatively, the resin springs 4b may be grouped in two arrays. When this is the case, the signal input/output terminals 3 of the flexible substrate 2 and the signal input/output terminals 6 of the external substrate 5 need be arranged according to the resin springs 4b.

[0038] As detailed in the foregoing, a terminal connecting device for a flexible substrate in accordance with the present invention connects signal input/output terminals of a film-like flexible substrate provided with a wiring pattern to those of an external substrate and includes:

> press means for pressing the signal input/output terminals of the flexible substrate to those of the external substrate from a surface opposite to one where the signal input/output terminals of the flexible substrate are provided.

[0039] In the arrangement, the press means presses the signal input/output terminals of the flexible substrate from a surface opposite to one where those of the flexible substrate are provided, to establish connections between those of the flexible substrate and those of the external substrate; therefore, establishment of electrically conducting paths is ensured between the flexible substrate and the external substrate. There is no longer a need to provide connectors or the like for connecting these signal input/output terminals on the external substrate. This allows for reduction in size and weight of the external substrate.

[0040] Further, a terminal connecting device for a flexible substrate is preferably such that:

> the press means is divided into more than one part whose number corresponds to the number of the signal input/output terminals of the external substrate and includes an elastic body acting as a spring.

[0041] In the arrangement, the elastic body acting as a spring is divided into more than one part whose number corresponds to the number of the signal input/output terminals of the substrate; therefore, each divided elastic body part presses an associated signal input/output terminals of the flexible substrate. The divided elastic body parts, when compared to a single elastic body, more certainly and efficiently apply pressure to individual signal input/output terminals.

[0042] Further, a terminal connecting device for a flexible substrate preferably further includes:

> a support base for supporting the elastic body; and
> a hold body for holding the support base to the external substrate in such a manner that the support base can be freely attached to and detached from the external substrate.

[0043] In the arrangement, the support base of the elastic body is provided with a hold body for holding the support base to the external substrate in such a manner that the support base can be freely attached to and detached from the external substrate; therefore, the terminal connecting device for a flexible substrate can be connected to the external substrate, and at the same time, the signal input/output terminals of the flexible substrate can be connected to those of the external substrate.

[0044] This allows for facilitation of connecting the signal input/output terminals of the flexible substrate and of the external substrate.

[0045] Further, a terminal connecting device for a flexible substrate is preferably such that:

> the elastic body has a free end that can swing freely and a secured end that is secured to the support base.

[0046] In the arrangement, the elastic body has a free end and a secured end; therefore, stress can be efficiently transmitted at the contacts of the signal input/output terminals of the external substrate and those of the flexible substrate from those of the elastic body to those of the external substrate. Pressure can be thus more efficiently applied to the flexible substrate.

[0047] A terminal connecting device for a flexible substrate is preferably such that:

> the elastic body has a hump that contacts the flexible substrate.

[0048] In the arrangement, the elastic body acting as a spring has a hump for contacting the flexible substrate; the elastic body contacts the flexible substrate in a reduced area. The elastic body with a hump, when compared to one with no hump, can press the flexible substrate to the external substrate with stronger force, which better ensures establishment of connections between the signal input/output terminals.

[0049] Further, a terminal connecting device for a flexible substrate preferably further includes:

a first hold member for holding the flexible substrate to the support base at a predetermined place near the secured end; and
a second hold member for holding the flexible substrate to the support base at a predetermined place near the free end.

[0050] In the arrangement, the flexible substrate is held to the support base by the first hold member near the secured end and by the second hold member near the free end; therefore, the flexible substrate can be prevented from hovering near the secured and free ends. This provides protection to the flexible substrate in, for example, loading or mounting it in a device, since there is no likelihood of it being caught. Further, the terminals likely make a short circuit with an adjacent one if the flexible substrate is displaced relative to a housing even by small amounts; however, since the flexible substrate is held at predetermined places, there is no longer a need for positioning, which improves operating efficiency.

[0051] A terminal connecting device for a flexible substrate is preferably such that:

the second hold member includes an elongated member that thrusts through a hole formed in the flexible substrate so that the flexible substrate is positioned with a longitudinal side thereof parallel to a direction from the secured end to the free end.

[0052] In the arrangement, the second hold member including an elongated member thrusts through a hole thus formed in the flexible substrate; therefore, a motion of the flexible substrate caused by distortion of the elastic body near the free end does not produce negative effects, which ensures the flexible substrate is held in place. This eliminates the need for positioning and improves operating efficiency.

[0053] A terminal connecting device for a flexible substrate is preferably such that:

the elastic body is formed as an integral part of a support base for supporting the elastic body.

[0054] In the arrangement, the elastic body is formed as an integral part of the support base; therefore, stress can be efficiently transmitted at the contacts of the signal input/output terminals of the external substrate and those of the flexible substrate. Further, no parts or materials, such as a welding material, are needed to couple the elastic body to the support base, which reduces cost for parts and materials.

[0055] The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the scope of the invention, as long as they are included within the scope of the following claims.

Claims

1. A terminal connecting device (4) in combination with an external substrate (5) for a flexible substrate (2), comprising:

   press means (4b) for connecting signal input/output terminals (3) of the film-like flexible substrate (2) provided with a wiring pattern to those (6) of the external substrate (5) by pressing the signal input/output terminals (3) of the flexible substrate (2) to those (6) of the external substrate (5) from a surface opposite to one where the signal input/output terminals (3) of the flexible substrate (2) are provided;
   a hold body (4c), wherein the device (4) is adapted to be attached to the external substrate (5) by the hold body (4c); and
   hold members (4d, 4e), wherein the hold members (4c, 4e), and holes (2a, 2b) provided in the flexible substrate (2), are adapted to hold the flexible substrate (2) to the device (4), the hold members (4d, 4e) and holes (2a, 2b) adapted to hold the flexible substrate (2) to the device (4) before the device (4) is attached to the external substrate (5) by the hold body (4c),
   characterised in that
   the hold body (4c) has a claw structure that is adapted to engage the hold body (4c) to a recess (5a) in the external substrate (5).

2. The terminal connecting device (4) as defined in claim 1,
   wherein:

   the press means (4b) includes an elastic body (4b) acting as a spring and is divided into more than one part whose number corresponds to the number of the signal input/output terminals (6) of the external substrate (5).

3. The terminal connecting device (4) as defined in claim 2, further comprising:

   a support base (4a) for supporting the elastic body (4b), wherein
   the hold body (4c) is for holding the support base (4a) to the external substrate (5) in such a manner that the support base (4a) can be freely attached to and detached from the external substrate (5).

4. The terminal connecting device (4) as defined in claim 2,
   wherein:

   the elastic body (4b) has a free end that can swing freely and a secured end that is secured

to a support base (4a) for supporting the elastic body (4b).

5. The terminal connecting device (4) as defined in claim 1,
wherein:

the press means (4b) includes a plurality of springs each provided on their upper surface with an arching hump (7) that contacts the flexible substrate (2).

6. The terminal connecting device (4) as defined in claim 4, wherein the at least one hold member comprises:

a first hold member (4d) for holding the flexible substrate (2) to the support base (4a) at a predetermined place near the secured end; and
a second hold member (4e) for holding the flexible substrate (2) to the support base (4a) at a predetermined place near the free end.

7. The terminal connecting device (4) as defined in claim 6,
wherein:

the second hold member (4e) includes a second elongated member (4e) that thrusts through a second hole (2b) formed in the flexible substrate (2) so that the flexible substrate (2) is positioned with a longitudinal side thereof parallel to a direction from the secured end to the free end.

8. The terminal connecting device (4) as defined in any one of claims 2 through 7,
wherein:

the elastic body (4b) is formed as an integral part of a support base (4a) for supporting the elastic body (4b) .

9. The terminal connecting device (4) as defined in claim 3,
wherein:

the hold body (4c) has a slope surface at an end thereof.

10. The terminal connecting device (4) as defined in claim 6,
wherein:

the first hold member (4d) includes a first elongated member (4d) that thrusts through a first hole (2a) formed alongside a notch (2c) in the flexible substrate (2).

11. The terminal connecting device (4) as defined in claim 10,
wherein:

the first elongated member (4d) includes a cylindrical elongated portion and a head which has a larger diameter than the elongated portion.

12. The terminal connecting device (4) as defined in claim 11,
wherein:

the head has a larger diameter than the first hole (2a) .

13. The terminal connecting device (4) as defined in claim 7,
wherein:

the second elongated member (4e) includes a cylindrical elongated portion and a head which has a larger diameter than the elongated portion.

14. The terminal connecting device as defined in claim 1, wherein the signal input/outputterminals are provided at a terminal portion of the flexible substrate (2) on a front surface thereof, and the press means (4b) engages the rear surface of said flexible substrate (2) at said terminal portion so as to press said input/output terminals against a corresponding terminal of the external substrate (5).

15. A device according to claim 14 wherein said press means comprises a resilient spring finger projecting from a support base.

16. A device according to claim 15, wherein said spring finger has a convex surface portion for engaging said rear surface.

17. The terminal connecting device according to claim 1, wherein the press means comprises a set of spring finger-like press members for pressing the back surface of the flexible substrate (2) to urge respective signal input/output terminals on the front surface thereof against corresponding terminals on the external substrate.

18. The terminal connecting device (4) as defined in claim 1, wherein:

the at least one hold member comprises a first hold member (4e) provided so as to hold the film-like flexible substrate (2), such that an edge of the flexible substrate (2) is moveable in response to flexing of the press means (4b).

Patentansprüche

1. Anschlussklemmenanordnung (4) in Kombination mit einem externen Substrat (5) für ein flexibles Substrat (2), umfassend:

eine Presseinrichtung (4b) zum Verbinden von Signal-Eingangs/Ausgangs-Anschlüssen (3) des filmartigen flexiblen Substrats (2), das mit einem Verdrahtungsmuster versehen ist, mit denjenigen (6) des externen Substrats (5) durch Pressen der Signal-Eingangs/Ausgangs-Anschlüsse (3) des flexiblen Substrats (2) auf diejenigen (6) des externen Substrats von einer Seite aus, die einer Seite gegenüber liegt, an der die Signal-Eingangs/Ausgangs-Anschlüsse (3) des flexiblen Substrats (2) bereitgestellt sind;
einen Haltekörper (4c), wobei die Anordnung (4) dazu ausgelegt ist, durch den Haltekörper (4c) an dem externen Substrat (5) angeschlossen zu werden; und
Halteelemente (4d, 4e), wobei die Halteelemente (4c, 4e) und in dem flexiblen Substrat (2) bereitgestellte Löcher (2a, 2b) dazu ausgelegt sind, das flexible Substrat (2) gegen die Anordnung zu halten, und die Halteelemente (4d, 4e) und Löcher (2a, 2b) dazu ausgelegt sind, das flexible Substrat (2) gegen die Anordnung (4) zu halten, bevor die Anordnung (4) durch den Haltekörper (4c) an das externe Substrat (5) angeschlossen wird,
dadurch gekennzeichnet, dass
der Haltekörper (4c) eine Klauenstruktur aufweist, die dazu ausgelegt ist, den Haltekörper (4c) mit einer Ausnehmung (5a) in dem externen Substrat (5) in Eingriff zu bringen.

2. Anschlussklemmenanordnung (4) nach Anspruch 1, bei der:

die Presseinrichtung (4b) einen elastischen Körper (4b) beinhaltet, der als eine Feder wirkt und in mehr als einen Teil unterteilt ist, deren Anzahl der Anzahl der Signal-Eingangs/Ausgangs-Anschlüsse (6) des externen Substrats (5) entspricht.

3. Anschlussklemmenanordnung (4) nach Anspruch 2, ferner umfassend:

eine Abstützbasis (4a) zum Abstützen des elastischen Körpers (4b), wobei
der Haltekörper (4c) dazu dient, die Abstützbasis (4a) derart gegen das externe Substrat (5) zu halten, dass die Abstützbasis (4a) frei an das externe Substrat (5) angeschlossen und von diesem getrennt werden kann.

4. Anschlussklemmenanordnung (4) nach Anspruch 2, bei der:

der elastische Körper (4b) ein freies Ende, das frei schwingen kann, und ein befestigtes Ende, das zum Abstützen des elastischen Körpers (4b) an einer Abstützbasis (4a) befestigt ist, aufweist.

5. Anschlussklemmenanordnung (4) nach Anspruch 1, bei der:

die Presseinrichtung (4b) eine Vielzahl von Federn aufweist, von denen jede an ihrer oberen Oberfläche mit einem sich wölbenden Höcker (7) versehen ist, der das flexible Substrat (2) kontaktiert.

6. Anschlussklemmenanordnung (4) nach Anspruch 4, bei der das zumindest eine Halteelement umfasst:

ein erstes Halteelement (4d) zum Halten des flexiblen Substrats (2) gegen die Abstützbasis (4a) an einem vorbestimmten Platz nahe dem befestigten Ende; und
ein zweites Halteelement (4e) zum Halten des flexiblen Substrats (2) gegen die Abstützbasis (4a) an einem vorbestimmten Platz nahe dem freien Ende.

7. Anschlussklemmenanordnung (4) nach Anspruch 6, bei der:

das zweite Halteelement (4e) ein zweites gestrecktes Element (4e) beinhaltet, das durch ein in dem flexiblen Substrat (2) ausgeformtes zweites Loch (2b) stößt, so dass das flexible Substrat (2) mit einer Längsseite desselben parallel zu einer Richtung von dem befestigten Ende zu dem freien Ende positioniert wird.

8. Anschlussklemmenanordnung (4) nach einem der Ansprüche 2 bis 7, bei der:

der elastische Körper (4b) als ein integraler Teil einer Abstützbasis (4a) zum Abstützen des elastischen Körpers (4b) ausgeformt ist.

9. Anschlussklemmenanordnung (4) nach Anspruch 3, bei der:

der Haltekörper (4c) eine schräge Oberfläche an einem Ende desselben aufweist.

10. Anschlussklemmenanordnung (4) nach Anspruch 6, bei der:

das erste Halteelement (4d) ein erstes gestreck-

tes Element (4d) beinhaltet, das durch ein erstes Loch (2a) stößt, das entlang einer Aussparung (2c) in dem flexiblen Substrat (2) ausgeformt ist.

11. Anschlussklemmenanordnung (4) nach Anspruch 10, bei der:

das erste gestreckte Element (4d) einen zylindrischen gestreckten Abschnitt und einen Kopf, welcher einen größeren Durchmesser als der gestreckte Abschnitt hat, beinhaltet.

12. Anschlussklemmenanordnung (4) nach Anspruch 11, bei der:

der Kopf einen größeren Durchmesser als das erste Loch (2a) hat.

13. Anschlussklemmenanordnung (4) nach Anspruch 7, bei der:

das zweite gestreckte Element (4e) einen zylindrischen gestreckten Abschnitt und einen Kopf, welcher einen größeren Durchmesser als der gestreckte Abschnitt hat, beinhaltet.

14. Anschlussklemmenanordnung (4) nach Anspruch 1, bei der die Signal-Eingangs/Ausgangs-Anschlüsse an einem Anschlussabschnitt des flexiblen Substrats (2) an einer stirnseitigen Oberfläche desselben bereitgestellt sind, und die Presseinrichtung (4b) die rückseitige Oberfläche des flexiblen Substrats (2) an dem Anschlussabschnitt (2) in Eingriff bringt, um die Eingangs/Ausgangs-Anschlüsse gegen einen entsprechenden Anschluss des externen Substrats (5) zu pressen.

15. Anordnung nach Anspruch 14, bei der die Presseinrichtung einen elastischen Federfinger umfasst, der aus einer Abstützbasis heraus ragt.

16. Anordnung nach Anspruch 15, bei der der Federfinger einen konvexen Oberflächenabschnitt zum Eingreifen der rückseitigen Oberfläche aufweist.

17. Anschlussklemmenanordnung nach Anspruch 1, bei der die Presseinrichtung einen Satz von Federfinger-artigen Presselementen zum Pressen der hinteren Oberfläche des flexiblen Substrats (2) umfasst, um jeweilige Signal-Eingangs/Ausgangs-Anschlüsse auf der vorderen Oberfläche desselben gegen entsprechende Anschlüsse auf dem externen Substrat zu drängen.

18. Anschlussklemmenanordnung (4) nach Anspruch 1, bei der:

das zumindest eine Halteelement ein erstes Halteelement (4e) umfasst, das bereitgestellt ist, um das filmartige flexible Substrat (2) derart zu halten, dass eine Kante des flexiblen Substrats (2) in Antwort auf ein Biegen der Presseinrichtung (4b) beweglich ist.

Revendications

1. Dispositif de connexion de bornes (4), en combinaison avec un substrat externe (5), pour un substrat flexible (2), comprenant :

des moyens de pressage (4b) pour connecter des bornes d'entrée/de sortie de signal (3) du substrat flexible analogue à un film (2), muni d'un schéma de câblage, avec celles (6) du substrat externe (5), en pressant les bornes d'entrée/de sortie de signal (3) du substrat flexible (2) sur celles (6) du substrat externe (5) à partir d'une surface opposée à celle où les bornes d'entrée/de sortie de signal (3) du substrat flexible (2) sont fournies ;
un corps de soutien (4c), le dispositif (4) étant adapté pour être fixé sur un substrat externe (5) par le corps de soutien (4c) ; et
des éléments de soutien (4d, 4e), les éléments de soutien (4c, 4e) et les trous (2a, 2b) fournis dans le substrat flexible (2) étant adaptés pour soutenir le substrat flexible (2) sur le dispositif (4) avant que le dispositif (4) ne soit fixé sur le substrat externe (5) par un corps de soutien (4c),
caractérisé en ce que
le corps de soutien (4c) a une structure de griffe qui est adaptée pour mettre en prise le corps de soutien (4c) avec un évidement (5a) dans le substrat externe (5).

2. Dispositif de connexion de bornes (4) selon la revendication 1,
dans lequel :

les moyens de pressage (4b) comprennent un corps élastique (4b) agissant comme un ressort, et sont divisés en plus d'une partie dont le nombre correspond au nombre de bornes d'entrée/de sortie de signal (6) du substrat externe (5).

3. Dispositif de connexion de bornes (4) selon la revendication 2, comprenant en outre :

une base de support (4a) pour supporter le corps élastique (4b), dans lequel
le corps de soutien (4c) est destiné à soutenir la base de support (4a) sur le substrat externe (5) de telle manière que la base de support (4a) peut être librement fixée sur le substrat externe

(5), et détachée de celui-ci.

4. Dispositif de connexion de bornes (4) selon la revendication 2,
dans lequel :

le corps élastique (4b) a une extrémité libre qui peut tourner librement, et une extrémité fixe qui est fixée sur la base de support (4a) pour supporter le corps élastique (4b)

5. Dispositif de connexion de bornes (4) selon la revendication 1,
dans lequel :

les moyens de pressage (4b) comprennent une pluralité de ressorts munis chacun, sur leur surface supérieure, d'une bosse en arc (7) qui vient en contact avec le substrat flexible (2).

6. Dispositif de connexion de bornes (4) selon la revendication 4, dans lequel le au moins un élément de soutien comprend :

un premier élément de soutien (4d) pour soutenir le substrat flexible (2) sur la base de support (4a) à un emplacement prédéterminé à proximité de l'extrémité fixe ; et
un second élément de soutien (4e) pour soutenir le substrat flexible (2) sur la base de support (4a) à un emplacement prédéterminé à proximité de l'extrémité libre.

7. Dispositif de connexion de bornes (4) selon la revendication 6,
dans lequel :

le second élément de soutien (4e) comprend un second élément allongé (4e) qui est poussé à travers un second trou (2b) formé dans le substrat flexible (2), de sorte que le substrat flexible (2) est positionné en ayant un côté longitudinal de celui-ci parallèle à une direction depuis l'extrémité fixe vers l'extrémité libre.

8. Dispositif de connexion de bornes (4) selon l'une quelconque des revendications 2 à 7,
dans lequel :

le corps élastique (4b) est formé sous la forme d'une partie en un seul bloc de la base de support (4a) pour supporter le corps élastique (4b).

9. Dispositif de connexion de bornes (4) selon la revendication 3,
dans lequel :

le corps de soutien (4c) a une surface en pente à une extrémité de celui-ci.

10. Dispositif de connexion de bornes (4) selon la revendication 6,
dans lequel :

le premier élément de soutien (4d) comprend un premier élément allongé (4d) qui est poussé à travers un premier trou (2a) formé le long d'une encoche (2c) dans le substrat flexible (2).

11. Dispositif de connexion de bornes (4) selon la revendication 10,
dans lequel :

le premier élément allongé (4d) comprend une partie allongée cylindrique et une tête qui a un plus grand diamètre que la partie allongée.

12. Dispositif de connexion de bornes (4) selon la revendication 11,
dans lequel :

la tête a un plus grand diamètre que le premier trou (2a).

13. Dispositif de connexion de bornes (4) selon la revendication 7,
dans lequel:

le second élément allongé (4e) comprend une partie allongée cylindrique et une tête qui a un plus grand diamètre que la partie allongée.

14. Dispositif de connexion de bornes selon la revendication 1, dans lequel les bornes d'entrée/de sortie de signal sont agencées à une partie terminale du substrat flexible (2) sur une surface avant de celui-ci, et les moyens de pressage (4b) vient en prise avec la surface arrière dudit substrat flexible (2) au niveau de ladite partie terminale afin de presser lesdites bornes d'entrée/de sortie contre une borne correspondante du substrat externe (5).

15. Dispositif selon la revendication 14, dans lequel lesdits moyens de pressage comprennent un doigt de ressort élastique faisant saillie à partir de la base de support.

16. Dispositif selon la revendication 15, dans lequel ledit doigt de ressort a une partie de surface convexe destinée à venir en prise avec une surface arrière.

17. Dispositif de connexion de bornes selon la revendication 1, dans lequel les moyens de pressage comprennent un ensemble d'éléments de pressage analogues à un doigt de ressort pour presser la surface arrière du substrat flexible (2) afin de pousser les

bornes d'entrée/de sortie de signal respectives, sur sa surface avant, contre les bornes correspondantes sur le substrat externe.

18. Dispositif de connexion de bornes (4) selon la revendication 1, dans lequel :

le au moins un élément de soutien comprend un premier élément de soutien (4e) agencé afin de soutenir le substrat flexible analogue à un film (2), de sorte qu'un bord du substrat flexible (2) est mobile en réponse à une flexion des moyens de pressage (4b).

FIG. 1

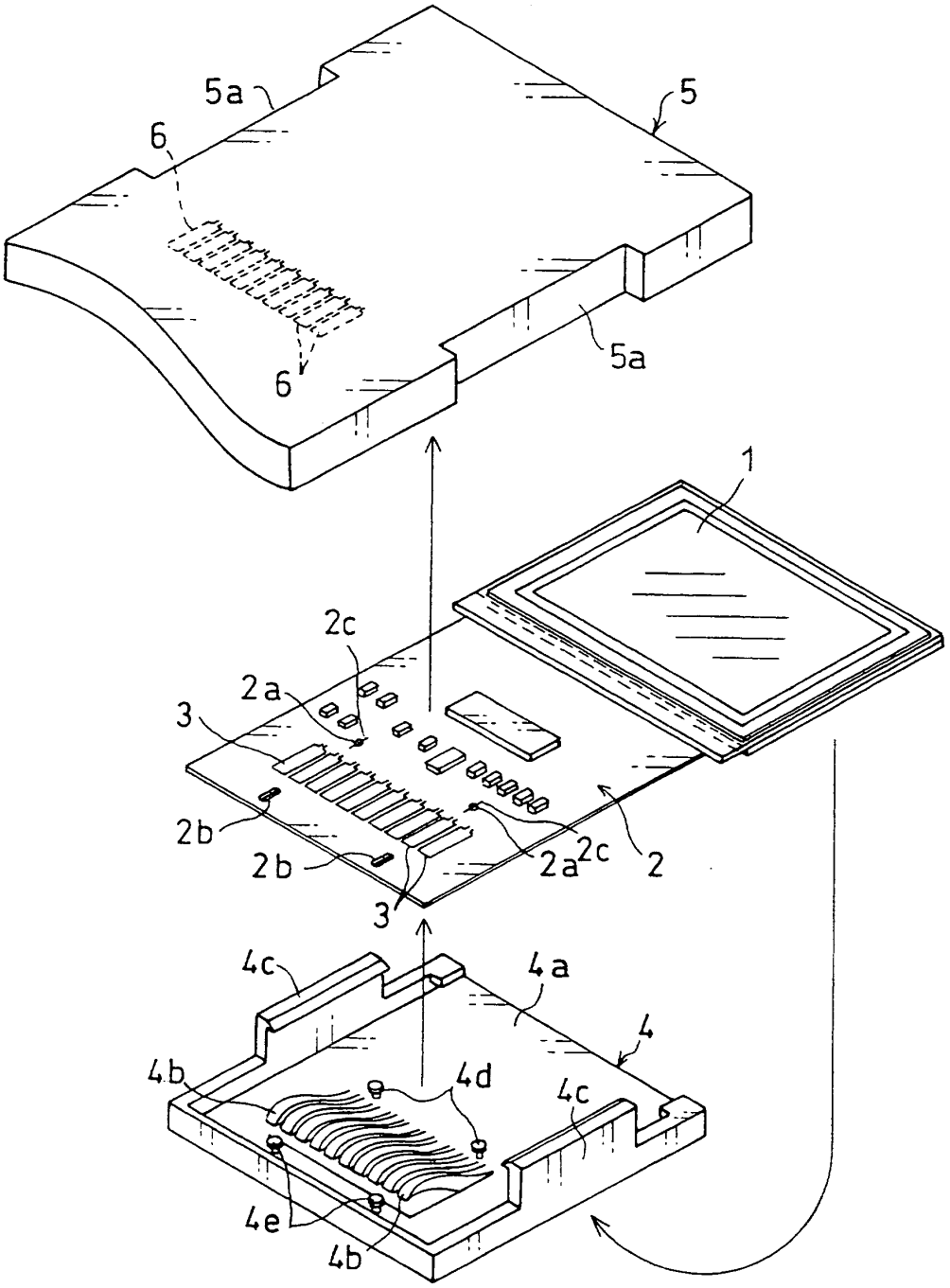


FIG. 2

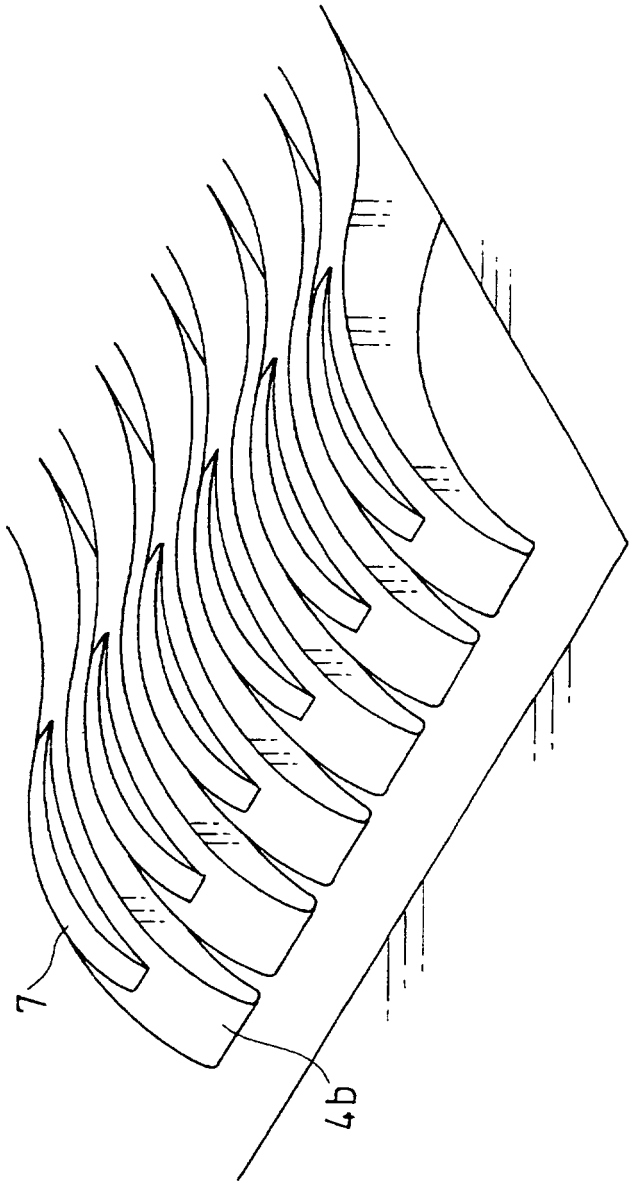


FIG. 3

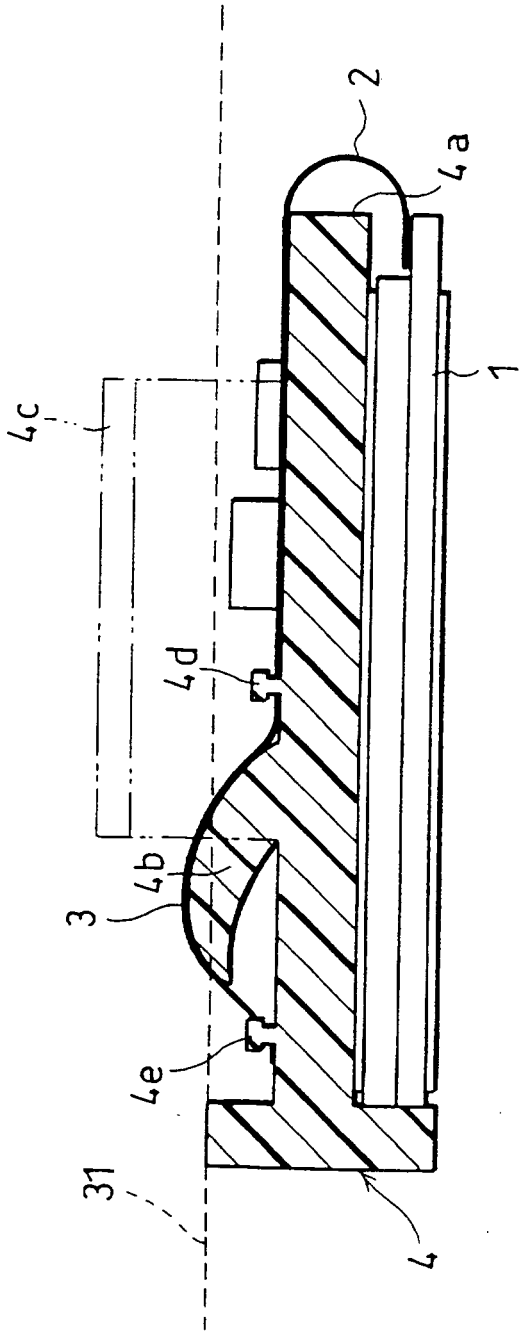


FIG. 4

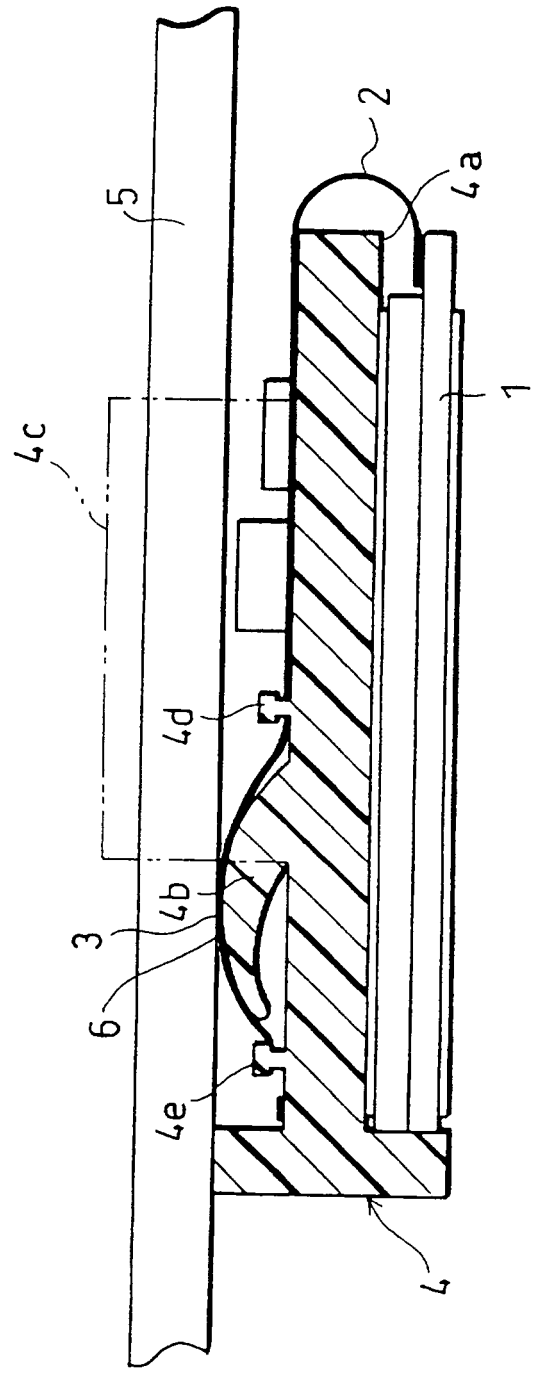


FIG. 5 (PRIOR ART)

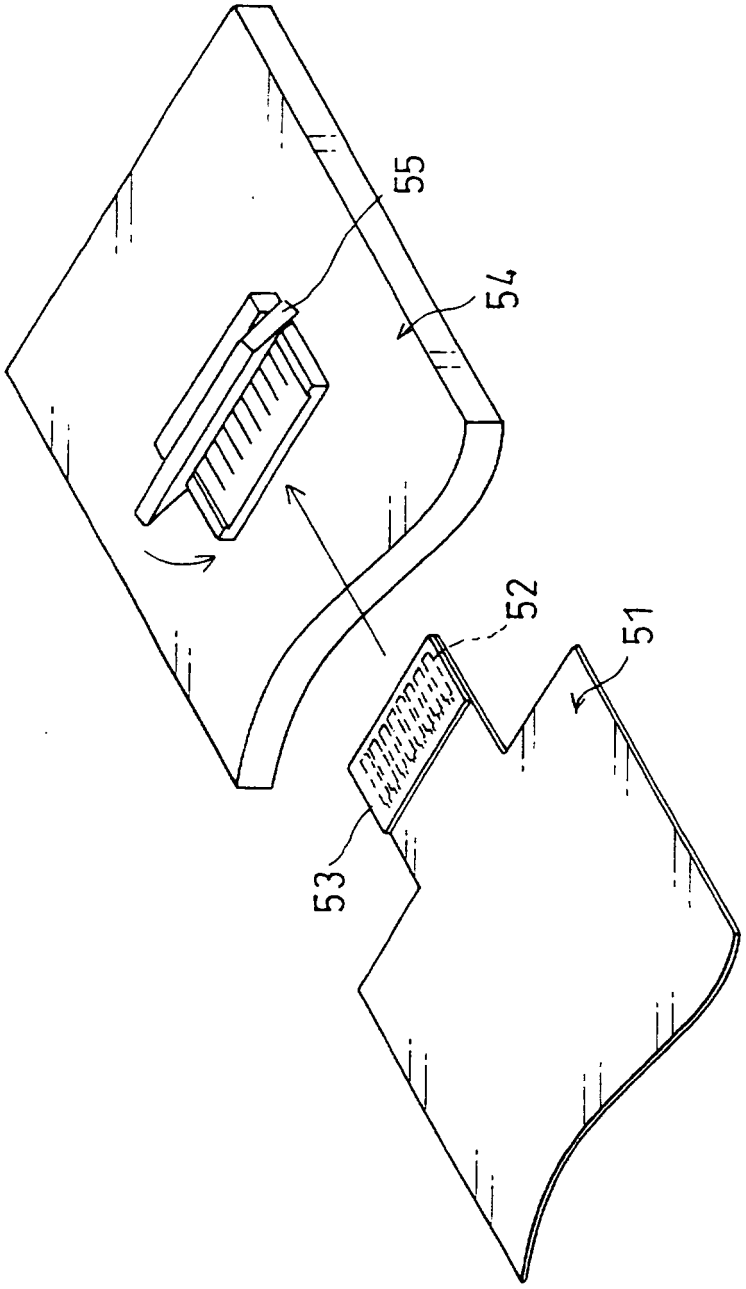
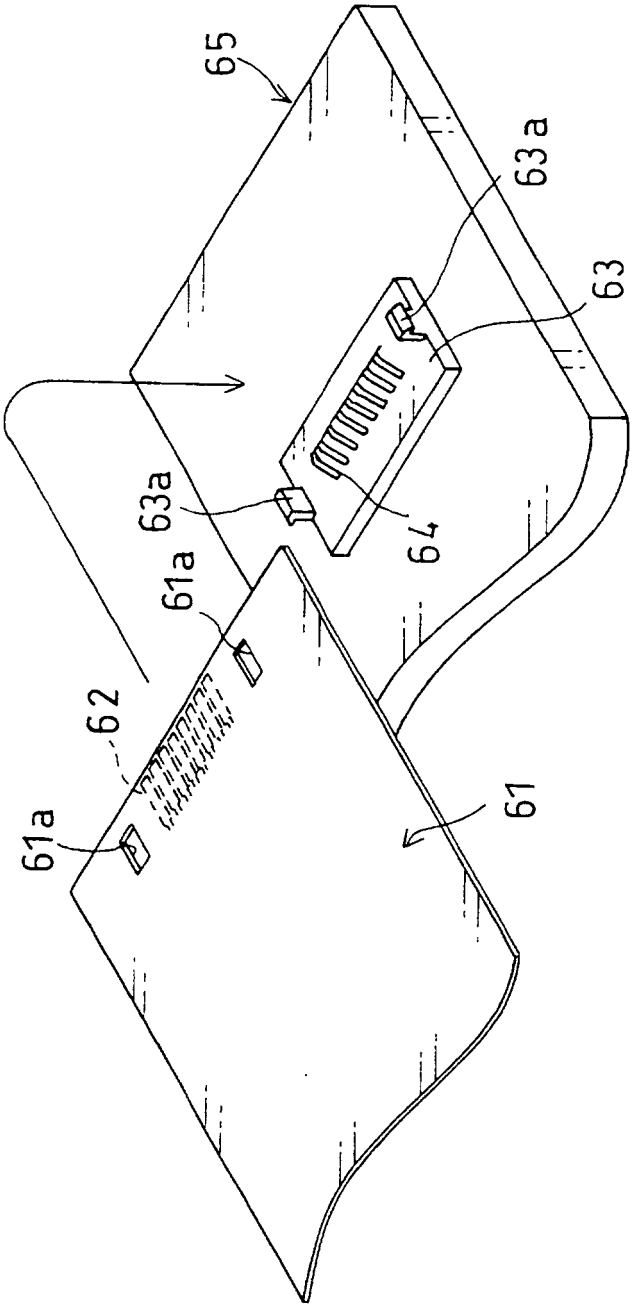


FIG. 6 (PRIOR ART)



REFERENCES CITED IN THE DESCRIPTION

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